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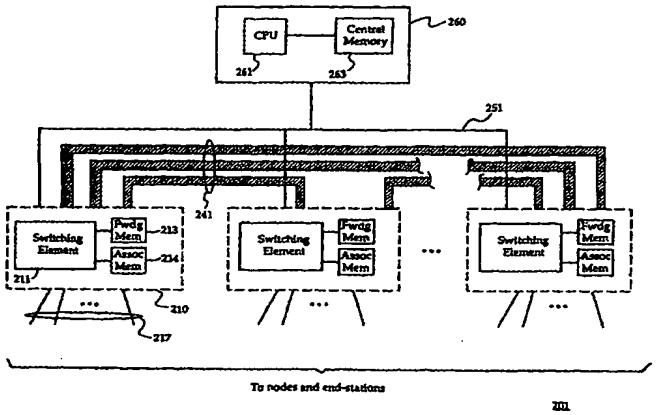

(57) Abstract

A multi-layer distributed network element for relaying packets according to known routing protocols. A distributed architecture of multiple subsystems (210) delivers routing at wire-speed performance across subnetworks. Each subsystem (210) includes a forwarding memory (213) and an associated memory (214) and is configured to identify unicast and multicast packets for routing purposes, modify the packets in hardware, including replace VLAN information, and forward the packets to the next hop. The routing decisions are made in the inbound subsystem (410), and packets and associated control information are forwarded, if necessary given the network topology, through a separate outbound subsystem (420). When packets traverse the internal links from one subsystem to another, encapsulation operations are conducted such as appending an additional cyclic redundancy code (CRC) to the packet before going through the internal link.